185. ICA advocates requiring access customers to flow through to those customers' end users the reductions in the access charges they pay attributable to PCI reductions.[301] We have determined that there are no longer any dominant carriers in the market for interexchange services,[302] and that long-distance carriers have been passing through access charge reductions in the past.[303] We see nothing to indicate that market forces will not compel IXCs to flow through access charge reductions. We note that at least one IXC has committed to flow through to its long distance consumers all access charge reductions resulting from the access charge-related decisions we adopt today.[304]

186. Cincinnati Bell claims that the X-Factors in the interim plan are too high for small and mid-sized LECs.[305] Cincinnati Bell also complains that prohibiting LECs electing price caps to ever revert to rate-of-return regulation discourages some small and mid-sized LECs from adopting price caps, and recommends requiring only a four-year commitment.[306] Issues related to incentive regulation for small and mid-sized LECs are beyond the scope of this proceeding.

187. Some LECs argue that the passage of the 1996 Act necessitates resolution of the issues on which we sought comment in the Price Cap Second Further Notice.[307] We have invited further comment on several Price Cap Second Further Notice issues in the Access Reform Notice, and plan to resolve the issues in a subsequent Order in the Access Reform proceeding.

188. Bell Atlantic asserts that high capacity access services are now competitive enough to remove from price cap regulation.[308] Bell Atlantic also recommends eliminating

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[301] ICA Comments at 9.

[302] Motion of AT&T Corp. to be Reclassified as a Non-Dominant Carrier, Order, 11 FCC Rcd 3271 (1995).

[303] See LEC Price Cap Performance Review, 10 FCC Rcd at 8987 (para. 61).

[304] We also note that AT&T has made specific commitments to reduce its basic schedule rates, which are often used by low-volume customers. See Ex Parte Letter from Gerald M. Lowrie, Senior Vice President, AT&T, to Reed E. Hundt, Chairman, FCC, May 3, 1997.

[305] Cincinnati Bell Comments at 7.

[306] Cincinnati Bell Comments at 8.

[307] Ameritech Reply at 7; BellSouth Reply at 6; Southwestern Bell Reply at 3-5.

[308] Bell Atlantic Comments at 17-18. Bell Atlantic also includes with its comments an affidavit of Alfred Kahn, pointing out the pernicious effects of continuing to regulate a service after it has become competitive. See Bell Atlantic Comments, Kahn Aff.

the new services test.[309] USTA and Ameritech maintain that, since AT&T has been found to be non-dominant, services in the interexchange basket should be removed from price cap regulation.[310] Pacific maintains that LECs should be permitted more common line pricing flexibility.[311] NCTA assert that the price cap plan does not adequately protect against cross-subsidization.[312] We sought comment on the new services test, pricing flexibility, and extending streamlined or non-dominant treatment to LECs in the Price Cap Second Further Notice and the Access Reform Notice, and we will address those issues in subsequent Orders in the Access Reform proceeding.

189. CCTA asserts that a moving average TFP-based X-Factor might give LECs the ability to manipulate costs, and thus might lead to cross-subsidization. CCTA therefore recommends adopting cost allocation rules for cable services.[313] Because we are not adopting a moving average-based X-Factor at this time, we need not determine whether any cost allocation rules for cable services are necessary.

190. On February 23, 1996, Ad Hoc filed a motion alleging that USTA had not provided sufficient information to enable other parties to review USTA's economic studies. Ad Hoc requested us either to compel USTA to provide the information, or to place no weight on USTA's study, as we stated we would do in the Price Cap Fourth Further Notice.[314] USTA asserted that it did provide Ad Hoc with all the data reasonably necessary to review its study. We did not rely on the parts of USTA's study that Ad Hoc claimed were not adequately supported on the public record. Therefore, we dismiss Ad Hoc's motion.

[309] Bell Atlantic Comments at 19.

[310] USTA Comments at 47; Ameritech Reply at 7 n.12.

[311] Pacific Reply at 14-15.

[312] NCTA Reply at 2.

[313] CCTA Reply at 22-28. See also NCTA Reply, Att. A at 15.

[314] See Price Cap Fourth Further Notice, 10 FCC Rcd at 13662 (para. 15).

# IX. PROCEDURAL ISSUES

## A. Tariff Filing Requirements

191. We hereby direct price cap LECs to file tariffs making adjustments to their rates to reflect the revisions to the price cap plan we adopt in this Order. Any carriers making only rate reductions must file their tariff revisions no later than June 25, 1997, to take effect July 1, 1997. Other LECs must file their tariff revisions no later than June 17, 1997. We also direct price cap LECs to file revised tariff review plans (TRPs) containing adjustments to their PCIs, APIs, and SBIs no later than June 2, 1997.

## B. Final Regulatory Flexibility Act Certification

192. In the Price Cap Fourth Further Notice, we certified that the Regulatory Flexibility Act (RFA)[315] did not apply to this rulemaking proceeding because none of the rule amendments under consideration would have a significant economic impact on a substantial number of small entities.[316] Carriers subject to price cap regulation for local exchange access affected by the rule amendments adopted in this Fourth Report and Order and Second Report and Order are generally large corporations or the affiliates of such corporations. No party commented specifically in response to the analysis in our certification.

193. In passing the 1996 Act, Congress sought to establish "a pro-competitive, de-regulatory national policy framework" for the United States telecommunications industry.[317] These fundamental changes in the structure and dynamics of the telecommunications industry wrought by the 1996 Act now necessitate that the Commission review its existing access charge regulations to ensure that they are consistent and compatible with the 1996 Act's comprehensive changes. The rule revisions we adopt based on the record developed in the Price Cap Fourth Further Notice and the Access Reform Notice will facilitate the de-regulatory policy established in the 1996 Act. In particular, our elimination of sharing obligations removes a major impediment to deregulating individual interstate access services at the time competitive conditions warrant.

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[315] See 5 U.S.C. § 601 et seq. The RFA was amended by the Contract With America Advancement Act of 1996, Pub.L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

[316] Price Cap Fourth Further Notice, 10 FCC Rcd at 13682 (para. 149); see also 5 U.S.C. § 601(3).

[317] Telecommunications Act of 1996, Pub.L.No. 104-104, 110 Stat. 56 (1996) (to be codified at 47 U.S.C. §§ 151 et seq.).

194. The rules we adopt in this Fourth Report and Order and Second Report and Order are applicable only to LECs subject to price cap regulation. Currently, 13 incumbent LECs are subject to price cap regulation. We tentatively concluded in the Price Cap Fourth Further Notice that the price cap LECs are not "small business concerns" because they are generally large corporations or affiliates of such corporations.[318] We hereby affirm this analysis.

195. The Commission will send a copy of this final certification, along with this Fourth Report and Order and Second Report and Order, in a report to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1996, 5 U.S.C. § 801(a)(1)(A), and to the Chief Counsel for Advocacy of the Small Business Administration, 5 U.S.C. § 605(b). A copy of this certification will also be published in the Federal Register.[319]

## X. ORDERING CLAUSES

196. Accordingly, IT IS ORDERED, pursuant to authority contained in Sections 4(i), 4(j), 201-205, 303(r), and 403 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 154(j), 201-205, 303(r), 403, and Section 553 of Title 5, United States Code, that Part 61 of the Commission's Rules, 47 C.F.R. Part 61, IS AMENDED as set forth in Appendix C.

197. IT IS FURTHER ORDERED that the provisions in this Order will be effective June 17, 1997. We find good cause under 5 U.S.C. § 553(d)(3) to make the rules effective less than thirty days after publication, because the local exchange carriers subject to price cap regulation must file tariffs by June 17, in order for them to be effective on July 1, 1997, as required by Section 69.3 of the Commission's rules, 47 C.F.R. § 69.3. In addition, to ensure that the local exchange carriers subject to price cap regulation have actual notice of these rules immediately following their release, we are serving those entities by overnight mail.

198. IT IS FURTHER ORDERED that local exchange carriers subject to price cap regulation SHALL FILE tariffs and revised tariff review plans in accordance with the requirements set forth above. These requirements are subject to review by the Office of Management and Budget, and will be effective upon that approval.

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[318] Price Cap Fourth Further Notice, 10 FCC Rcd at 13682 (para. 149).

[319] Id.

199. IT IS FURTHER ORDERED that the motion filed by Ad Hoc Telecommunications Users Committee on February 23, 1996, IS DISMISSED.

FEDERAL COMMUNICATIONS COMMISSION

William F. Caton
Acting Secretary

# APPENDIX A

## I. Comments filed January 16, 1996

1. Ad Hoc Telecommunications Users Committee (Ad Hoc)
2. American Petroleum Institute (API)
3. The Ameritech Operating Companies (Ameritech)
4. AT&T Corporation (AT&T)
5. The Bell Atlantic Telephone Companies (Bell Atlantic)
6. The BellSouth Telephone Companies (BellSouth)
7. Cincinnati Bell Telephone Company (Cincinnati Bell)
8. Frontier Corporation (Frontier)
9. General Services Administration (GSA)
10. GTE Service Corporation (GTE)
11. International Communications Association (ICA)
12. Lincoln Telephone and Telegraph Company (Lincoln)
13. MCI Telecommunications Corp. (MCI)
14. The NYNEX Telephone Companies (NYNEX)
15. Pacific Bell and Nevada Bell (Pacific)
16. Southwestern Bell Telephone Company (Southwestern Bell)
17. Southern New England Telephone Company (SNET)
18. Sprint Corporation (Sprint)
19. Time Warner Communications Holdings, Inc. (Time Warner)
20. Telecommunications Resellers Association (TRA)
21. United States Telephone Association (USTA)
22. US West Communications, Inc. (US West)

## II. Replies filed March 1, 1996

1. Ad Hoc
2. Ameritech
3. API
4. AT&T
5. Bell Atlantic
6. BellSouth
7. Cincinnati Bell
8. California Cable Television Association (CCTA)
9. Frontier
10. GSA
11. GTE

12. LDDS WorldCom (LDDS)
13. Lincoln[320]
14. MCI
15. MFS Communications Company (MFS)
16. National Cable Television Association (NCTA)
17. NYNEX
18. Pacific
19. Sprint
20. Southwestern Bell
21. TRA
22. USTA
23. US West

## III. Comments filed January 29, 1997, and Replies filed February 14, 1997

These comments and replies are listed in Appendix A of our companion Access Reform First Report and Order.

[320] Subsequent to the filing of this reply, Lincoln changed its name to Aliant Communications Co. For the purposes of this Order, we refer to Lincoln's 1997 pleadings as "Aliant 1997 Comments" or "Aliant 1997 Reply."

# APPENDIX B

## PLEADING SUMMARIES

## III. X-FACTOR CALCULATION ISSUES

### B. X-Factor Approaches

#### 1. Methods for Estimating the X-Factor

##### a. TFP

1. USTA asserts that both Ad Hoc and AT&T also base their recommendations on a TFP method.[1] MCI notes that the TFP methods proposed by Ad Hoc, AT&T, and USTA result in different X-Factor recommendations, and argues that TFP calculations are inexact and potentially controversial.[2] USTA alleges that MCI does not oppose a TFP-based X-Factor in general, but only USTA's application of TFP.[3] Frontier contends that both USTA's and AT&T's X-Factor recommendations seem extreme.[4] Cincinnati Bell asserts that the data collection required for TFP calculations might be burdensome, and might discourage small and mid-sized LECs from adopting price cap regulation.[5] GTE argues that TFP is a "robust" measure of productivity because it produces results comparable to the TFP results reached by Ad Hoc and AT&T.[6]

##### b. Historical Revenue Approach

[1] USTA Reply at 6.

[2] MCI Reply at 8-9. See also API Reply at 2 (any price cap plan should ensure consider benefit and be reasonably simple and verifiable).

[3] USTA Reply at 6.

[4] Frontier Reply at 1 n.2.

[5] Cincinnati Bell Reply at 5-6.

[6] GTE Reply at 6-7. Ad Hoc and AT&T propose higher X-Factors than USTA because they advocate including an input price differential and making an adjustment for any differences in interstate and intrastate productivity growth. These issues are discussed further below.

2. Several parties oppose the Historical Revenue Approach because it creates the perverse incentives created by rate-of-return regulation.[7] Lincoln and NYNEX oppose the Historical Revenue Approach because its incorporation of Part 36 and 69 rules makes the model administratively burdensome.[8] NYNEX also contends that accounting-based rules are a poor measure of a firm's economic performance.[9]

3. GSA supports the Historical Revenue Approach because it believes that it incorporates both TFP growth and the input price differential, although it does not identify either of these separately.[10] GSA argues that this approach is simpler than either AT&T's or USTA's TFP approach.[11] GSA denies that the Historical Revenue Approach recreates the incentives of rate-of-return regulation, at least when updated on a moving average basis.[12] TRA supports this approach because it would produce an X-Factor that would give LECs the strongest incentive to lower rates.[13]

### c. Historical Price Approach

4. A number of commenters maintain that the Historical Price Approach is inferior to TFP because it is not a direct measure of productivity.[14] Some parties argue that this approach is not reliable because of discontinuities in the available time series.[15] GTE and Southwestern Bell also criticize this approach as too sensitive to the 1984 data point.[16] USTA maintains that,

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[7] USTA Comments at 8-10 and App. C at 23-29; US West Comments at 19; NYNEX Comments at 24-25; GTE Comments at 31-33; Southwestern Bell Comments at 18-19; BellSouth Comments at 24-26; Bell Atlantic Comments at 15-16; NYNEX Reply at 17; USTA Reply at 21.

[8] Lincoln Comments at 10; NYNEX Reply at 17.

[9] NYNEX Reply at 18.

[10] GSA Comments at 3-4.

[11] GSA Reply at 8. Although it does not support TFP, GSA states it would prefer AT&T's model over USTA's model because it includes an input price differential and an interstate TFP adjustment. Id. at 7.

[12] GSA Reply at 8.

[13] TRA Comments at 6-7.

[14] USTA Comments at 10 and App. C at 30-31; NYNEX Comments at 25; GTE Comments at 33-34; Southwestern Bell Comments at 19; Bell Atlantic Comments at 16-17.

[15] NYNEX Comments at 25; USTA Comments at 11; GTE Comments at 34-35. See also US West Comments at 19 (adequate data for this approach is not publicly available).

[16] Southwestern Bell Comments at 20; GTE Comments at 35 n.64.

in theory, productivity growth can be measured using changes in output and input prices or in output and input quantities. USTA also argues that the Commission's results are not accurate because they are based on Part 36 and 69 accounting rules, and not based on total company data.[17] NYNEX argues that this method does not lend itself to updating through a moving average.[18]

5. BellSouth and Lincoln oppose the Historical Price Approach because its incorporation of Part 36 and 69 rules makes it administratively burdensome.[19] Nevertheless, if the Commission were to adopt a fixed X-Factor rather than one based on a moving average, BellSouth would support using the Spavins-Lande long-term study that was included in the Historical Price Approach.[20] ICA argues that the Historical Price Approach would be less administratively burdensome than USTA's original TFP model because it does not rely on non-publicly available data to the same extent as USTA's original TFP calculation.[21]

### d. Other X-Factor Methods

6. NYNEX and USTA oppose adoption of the current interim price cap plan as the long term plan, in part because it imposes sharing obligations on some LECs.[22] US West suggests extending the interim plan for one or two years, so that the Commission can consider US West's long-term proposal discussed below, and consider the effect of the Telecommunications Act of 1996 on the price cap plan.[23] NYNEX and USTA maintain that the combined Historical Price/Historical Revenue approach would create the same disincentives for productivity growth as the Historical Revenue approach as proposed by AT&T.[24] Frontier supported this approach in its comments on a "preliminary" basis.[25] USTA asserts that an econometric estimation of

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[17] USTA Comments, App. C at 29-32.

[18] NYNEX Comments at 25.

[19] BellSouth Comments at 27; Lincoln Comments at 10.

[20] BellSouth Comments at 32. BellSouth maintains that the Spavins-Lande method would result in an X-Factor of 2.1 percent if based on data from 1929 to 1993, and 2.4 percent if based only on post-divestiture data. Id.

[21] ICA Comments at 5-9.

[22] NYNEX Comments at 27; USTA Comments at 6.

[23] US West Comments at 3-5; US West Reply at 9-10. See also NYNEX Reply at 28.

[24] NYNEX Comments at 26; USTA Comments at 11-12.

[25] Frontier Comments at 3 n.3.

productivity growth would not pass through gains resulting from economies of scale, and argues that any econometric model sophisticated enough to be economically meaningful would not be relatively simple.[26]

7. US West suggests freezing the PCIs at their current levels as a means of simplifying the price cap plan.[27] US West argues that growing competition will be adequate to protect consumers' interests, and that a more rigorous price cap plan might distort competition, or force prices low enough to deter entry.[28] US West asserts that AT&T supported a similar plan in 1990.[29] AT&T replies that US West's assumptions regarding competition are unsupported and speculative.[30] AT&T and GSA also oppose US West's plan because it would in effect reduce the X-Factor to be equal to GDP-PI.[31] Pacific attaches to its reply a California PUC opinion, in which the California PUC did freeze the PCIs in its jurisdiction for three years. Specifically, the California PUC found that, while the record before it was not sufficient to project the level and speed of competition growth in its jurisdiction,[32] that growth is likely to be sufficient to restrain prices enough to warrant setting the X-Factor equal to GDP-PI.[33] CCTA discounts the California PUC's conclusions as based on speculative and anecdotal evidence, and observes that the California Administrative Law Judge (ALJ) reached different conclusions.[34]

8. US West also suggests retaining the interim plan until the 1997 annual access filings are due, to give the Commission adequate time to consider its proposal.[35] BellSouth recommends retaining the interim plan for another year, to permit the Commission to focus on

[26] USTA Comments at 6-8. See also NYNEX Comments at 27.

[27] US West Comments at 3-5; US West Reply 4-5.

[28] US West Comments at 5; US West Reply at 6-9.

[29] US West Comments at 5 n.8, citing LEC Price Cap Order, 5 FCC Rcd at 6796 (para. 80).

[30] AT&T Reply at 63-64.

[31] AT&T Reply at 64-65; GSA Reply at 7.

[32] California PUC Opinion at 42.

[33] California PUC Opinion at 46, 51-52, 66-69.

[34] CCTA Reply at 10-11.

[35] US West Comments at 9-10.

rulemakings mandated by the 1996 Act.[36] CCTA recommends delaying any major changes to the price cap plan until we can see how the 1996 Act affects productivity growth.[37]

9. Based on calculating the anticipated rate of return that would have made it advantageous for a LEC to choose the 5.3 percent X-Factor rather than 4.0 percent, and the implicit X-Factor that would have produced that rate of return, MCI concludes that the LECs electing 5.3 percent anticipated an implicit X-Factor of at least 8.54 percent.[38] MCI also asserts that the break-even point under the original price cap plan, without sharing, was 11 percent, so MCI recommends setting the X-Factor between 8.5 percent and 11 percent.[39] Similarly, Ad Hoc asserts that the break-even point in the interim plan between 4.0 percent and 5.3 percent is an anticipated rate of return of between 13.24 percent and 13.42 percent.[40] Many LECs reply that their X-Factor selection does not reflect expected productivity growth, but rather an aversion to sharing.[41] On the other hand, Sprint claims that an X-Factor of 9.9 percent in the original price cap plan would have lowered the LECs' rates of return to 4.07 percent.[42]

### 2. Direct Approach

10. GTE argues that the Commission included an economy-wide inflation measure such as GDP-PI in the original price cap formula because there was no industry-specific inflation measure available at the time.[43] GTE also recommends removing GDP-PI from the price cap formula and basing the PCI on the difference between changes in LEC input prices and changes in TFP growth.[44] Ameritech, Sprint, and Lincoln make similar proposals.[45] Sprint and GTE

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[36] BellSouth Reply at 5-6.

[37] CCTA Reply at 18-19.

[38] MCI Reply at 9-11.

[39] MCI Reply at 11-14.

[40] Ad Hoc Reply, Att. at 27-28.

[41] Lincoln Reply at 6-7; Bell Atlantic Reply at 10-11; NYNEX Reply at 12; Pacific Reply at 3-4.

[42] Sprint Reply at 17.

[43] GTE Comments at 6, citing LEC Price Cap Order, 5 FCC Rcd at 6792-93.

[44] GTE Comments at 6-9 and App. A. Alternatively, GTE would support retaining GDP-PI and setting the X-Factor equal to the difference between economy-wide TFP growth and LEC TFP growth. GTE asserts that this formula is equivalent to its proposal, because it assumes that the long-run TFP input price differential is 0. GTE Comments at 10 and App. C; GTE Reply at 20-21.

[45] Ameritech Comments at 4-6; Ameritech Reply at 2; Sprint Comments at 5-9; Lincoln Comments at 7.

claim that this approach simplifies the PCI formula, and eliminating the economy-wide terms from the PCI formula eliminates sources of potential inaccuracy in measuring productivity growth or input price changes.[46] Sprint and Ad Hoc also argue that eliminating economy-wide data from the PCI formula would eliminate problems that could result from delays in reporting BLS statistics.[47] Sprint argues that any general measure of inflation will not reflect accurately the price changes in a specific industry, and estimates that using GDP-PI in the original price cap formula, without an explicit input price differential, created an upward bias of about 1.5 percent per year.[48] Sprint also denies that GDP-PI is in fact an "economy-wide" measure of inflation, because inter-industry transactions are excluded. Sprint contends that sales to final demand, measured by GDP, represents only one third of the economy.[49] Ameritech and Sprint note that a direct approach is consistent with the TFP method employed by the ICC.[50]

11. Bell Atlantic opposes this approach, because it would incorporate an input price differential. Bell Atlantic opposes the input price differential for reasons discussed below.[51] AT&T argues that the Direct Approach would eliminate only non-controversial terms in the formula which can be based on publicly available data, and so does not in fact simplify the PCI formula.[52] According to BellSouth, if we adopt this approach, we should also adopt a five-year moving average.[53] Ad Hoc would support this approach only if an objective method to measure LEC-specific input price changes could be developed.[54] Sprint discusses a means to develop a LEC-specific price index in detail.[55]

[46] Sprint Comments at 8; Sprint Reply at 3-7; GTE Reply at 18-20.

[47] Sprint Comments at 8-9; Ad Hoc Comments, Att. at 45.

[48] Sprint Reply, Att. A at 4-7, 13-16.

[49] Sprint Reply, Att. A at 24-27.

[50] Ameritech Comments at 4-6; Sprint Reply, Att. A at 7, 10-12.

[51] Bell Atlantic Comments at 17.

[52] AT&T Reply at 61-63.

[53] BellSouth Comments at 16-17.

[54] Ad Hoc Comments, Att. at 45-46.

[55] Sprint Reply, Att. A at 17-23.

12. Sprint recommends requiring LECs to reduce their PCIs by either 1.1 percent or 2.1 percent. Sprint would retain sharing requirements for LECs selecting 1.1 percent.[56] Sprint contends that, based on inflation levels from 1991 to 1994, the 1.1 percent adjustment would be approximately equal to a 4.5 percent X-Factor.[57] Sprint argues that this would represent expected total company productivity growth.[58] Sprint would base its no-sharing option of 2.1 percent on a 0.5 adjustment for the differences between interstate and intrastate productivity growth, and a consumer productivity dividend of 0.5 percent, that would be reduced by .125 percent in each of the following four years.[59]

## C. TFP Calculation Issues

### 2. TFP Models Placed in Current Record

#### a. USTA's Simplified TFP

13. USTA maintains that its simplified TFP model provides the best possible balance of providing LECs incentives to improve their efficiency and maintaining just and reasonable rates.[60] Pacific cites a recent California Public Utilities Commission (California PUC) opinion finding that TFP lies between 1.8 percent and 2.6 percent, and concluding that the TFP study conducted by USTA's consultant in this proceeding was more persuasive than other studies projecting productivity growth over 5 percent.[61]

14. NCTA and CCTA question whether LECs will have difficulty maintaining their historical levels of productivity, given that Pacific claimed that the infrastructure improvements it made in anticipation of providing video dialtone services would result in efficiency gains in

[56] Sprint Reply at 23.

[57] Sprint Reply at 23-24. Sprint also estimates that LEC TFP grew at about 3.85 percent from 1985 to 1991. The five-year moving average economy-wide TFP growth ranged from 0.0 percent to 0.38 percent from 1984 to 1993. Sprint Reply, Att. A at 43-44.

[58] Sprint Reply at 24.

[59] Sprint Reply at 24-25.

[60] USTA Comments at 4-6.

[61] Pacific Reply at 2-3, 14-16, citing Investigation on the Commission's Own Motion Into the Second Triennial Review of the Operations and Safeguards of the Incentive-Based Regulatory Framework for Local Exchange Carriers, I.95-05-047, Decision 95-12-052 (Dec. 20, 1995) (California PUC Opinion). Pacific attaches a copy of the California PUC Opinion to its reply.

telephone service provision.[62] CCTA also theorizes that the LECs' productivity growth might have been depressed from 1990 to 1994, while the LECs faced sharing requirements under the original price cap plan, and while some LECs were investing in video dialtone technology.[63] Some parties argue that, since most price cap LECs elected the 5.3 percent X-Factor in the interim plan, the Simplified TFP model does not adequately measure the LECs' expected future productivity growth when it produces an X-Factor of 3 percent.[64]

15. USTA also claims that its TFP method is comparable to that used by the Bureau of Labor Statistics (BLS).[65] Several LECs support using USTA's simplified TFP model.[66] USTA and other parties assert that USTA has improved its model by relying on publicly available data.[67] MCI argues that USTA has not eliminated all the non-publicly available data from its method, noting that USTA refers to unpublished data for its economic stock adjustment factors, and depreciation rates from Jorgenson, in its TFP Review Plan.[68]

### b. AT&T's Performance Based Model

16. Southwestern Bell and US West criticize this approach because it relies on accounting measures rather than "economic" measures.[69] Some LECs contend that an X-Factor as high as AT&T suggests would be confiscatory.[70] BellSouth asserts that AT&T's suggested X-Factor is inconsistent with the 5.54 percent it suggested on the basis of the Historical Revenue

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[62] NCTA Reply at 5-6; CCTA Reply at 3-4.

[63] CCTA Reply at 12-14.

[64] LDDS Comments at 3-4; Ad Hoc Reply at 2 and Att. at 39; MCI Reply at 5-6; NCTA Reply at 6; API Reply at 1-2. We discuss more specific criticisms of the Simplified TFP Model below.

[65] USTA Comments at 33-34.

[66] NYNEX Comments at 12-18, and Apps. A, B, and C; Southwestern Bell Comments at 1-3, 5-6, 17-18; BellSouth Comments at 24; Bell Atlantic Comments at 8-9; Pacific Comments at 1-2; SNET Comments at 2; Ameritech Comments at 3-4; NYNEX Reply at 3-5. See also US West Comments at 6-7; US West Reply at 10-12 (supporting USTA's proposal as an alternative to its own proposal).

[67] USTA Comments at 3-4; BellSouth Comments at 9; Southwestern Bell Comments at 3-5; USTA Reply at 7; Bell Atlantic Reply at 2; NYNEX Reply at 4-5; GTE Reply at 4-6.

[68] MCI Reply at 6-7, citing USTA Comments, Att. B at Chart MISC1, rows 500-620. See also TRA Reply at 4-5; Ad Hoc Reply, Att. at 41-43.

[69] Southwestern Bell Reply at 9-11; US West Reply at 12-13.

[70] Pacific Reply at 3. See also Sprint Reply at 17 (AT&T's X-Factor in original price cap plan would have reduced the LECs' average rate of return to 5.69 percent.)

Model, which AT&T argued would have been adequate to limit the industry average rate of return to 11.25 percent.[71]

### c. Ad Hoc's TFP Approach

17. Sprint claims that the X-Factor suggested by Ad Hoc overstates interstate productivity, and that using that X-Factor in the original price cap plan would have lowered the LECs' rates of return to 4.07 percent.[72]

## 3. Output Index Issues

### a. Mathematical Construction of Output Indices

18. In its simplified TFP model, USTA uses a Tornquist method to develop output quantity indices.[73] USTA uses an approximation of a chain-linked Paasche method to develop output price indices.[74] To calculate output quantities, USTA deflates booked revenues by its approximated Paasche Price Indices. USTA contends that a chain-weighted Paasche Price Index would be theoretically superior to a traditional fixed-weight Laspeyres and fixed-weight Paasche Price Indices.[75] USTA also provides a mathematical formula purporting to show that there is little percentage difference in the price index derived from its approximated Paasche Index and a true chain-linked Paasche price index.[76]

19. AT&T favors using the Fisher Ideal Index to construct the output indices, rather than the Tornquist Index used by USTA. AT&T argues that, unlike the Tornquist Index method used in USTA's model, the Fisher Ideal Index can accommodate the introduction or withdrawal of services during the period covered by the index. AT&T also claims that the Fisher Ideal Index gives the same result for TFP growth whether the computations are constructed from price indices or from quantity indices.[77] AT&T measures output directly, based on minutes of interstate access, number of end user access lines and special access lines as reported in ARMIS.

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[71] BellSouth Reply at 7-8.

[72] Sprint Reply at 17.

[73] USTA Comments at 14-15.

[74] USTA Comments at 14-15.

[75] USTA Comments, Att. A at 5.

[76] USTA Comments, Att. A at 36-39.

[77] AT&T Comments, App. B at 5-6.

AT&T asserts that this direct measurement of output results in more accurate output measures than deflating revenues as it asserts USTA does.[78]

20. BellSouth argues that BLS currently uses a Tornquist index, and that in any case, it is unlikely that any of the highly aggregated service categories would ever move to zero.[79] Some parties assert that the choice of index construction method has little effect on TFP results.[80] USTA also contends that the Tornquist Index has been more widely used in productivity research than the Fisher Ideal Index.[81] Sprint asserts that AT&T overstates interstate output by 1.6 percent, because it divides traffic-sensitive revenue requirement by number of lines rather than number of minutes of use.[82] Sprint also asserts that AT&T overstates intrastate output by 0.9 percent by omitting intraLATA usage in calculating state toll output.[83] Sprint contends that USTA's measurement of common line output is inconsistent, because it measures carrier common line usage in minutes and end user common line usage in number of access lines.[84] Ad Hoc also advocates developing output quantity indices directly based on number of lines and minutes of use.[85] USTA asserts that its and AT&T's output measurement are the same except for special access, and that measuring special access output in terms of number of lines is too simplistic.[86]

### b. Number of Output Catgories

21. USTA establishes seven output price and quantity indices, based on aggregations of revenue categories in ARMIS 43-02.[87] USTA contends that it is not possible to develop more

[78] AT&T Comments, Att. A at 72-73.

[79] BellSouth Reply, Att. at 30-31. See also USTA Reply, Att. A at 8-9.

[80] USTA Reply, Att. A at 8-9; Southwestern Bell Reply at 11; Bell Atlantic Reply, Att. 1 at 14.

[81] USTA Reply, Att. A at 8-9.

[82] Sprint Reply at 8-9.

[83] Sprint Reply at 8-9.

[84] Sprint Comments at 10.

[85] Ad Hoc Comments, Att. at 17-18; Ad Hoc Reply at 5 and Att. at 26. Ad Hoc also criticizes the output indexes in USTA's original TFP model. Ad Hoc Comments, Att. at 17. Because USTA has adopted a different method to develop output indexes, we will not consider Ad Hoc's comments on this issue here.

[86] USTA Reply, Att. A at 9-12.

[87] These output categories are local service, long distance service, interstate end user access, interstate switched access, interstate special access, intrastate access, and miscellaneous. USTA Comments at 15.

disaggregated output categories using publicly available data.[88] US West support USTA's output categorization.[89] GTE argues that indices should be disaggregated only to the point where the services within each index have roughly the same growth rates.[90] AT&T includes only three output indices, because its model is designed to measure interstate productivity growth rather than total company TFP as USTA's model measures.[91]

22. USTA claims that AT&T excludes the services in USTA's miscellaneous services category, and that this overestimates TFP by 0.4 percent from 1988-94, and 0.5 percent from 1989-94.[92]

### c. Weighting of Output Categories

23. AT&T recommends weighting the output indexes on a marginal cost basis, arguing that revenue weights will not approximate more economically meaningful marginal cost weights until competition has developed further.[93] BellSouth asserts that AT&T improperly assumes that fully distributed costs can be used as a surrogate for long-run marginal costs, and so in effect assumes that the LECs can achieve no economies of scale.[94] GTE replies that cost-based weights for output categories might tend to recreate the incentives of rate-of-return regulation.[95] Some parties assert that developing cost-based weights for output indexes would be difficult and contentious.[96] USTA and US West contend that revenue-weighting creates a more ambitious benchmark for LECs, because they believe cost-based weights place more emphasis on the output categories with slower growth.[97] US West claims that booked revenues are a reasonable

[88] USTA Comments at 15.

[89] US West Comments at 11.

[90] GTE Comments at 15-16.

[91] The interstate or total company TFP issue is discussed below.

[92] USTA 1997 Comments, Att. 6 at 8.

[93] AT&T Comments at 23-24 and App. A at 60-63; AT&T Reply at 34.

[94] BellSouth Reply. Att. at 29-30.

[95] GTE Reply at 7-9.

[96] USTA Comments at 16; BellSouth Comments at 10-11; USTA Reply, Att. A at 12-13; Bell Atlantic Reply, Att. 1 at 13.

[97] USTA Comments at 16; US West Comments at 12.

and publicly available substitute for billed revenues.[98] USTA contends that, unless we use revenue weights for the output indexes, LECs increasing their productivity will not be rewarded with increases in revenue.[99]

### 4. Input Index Issues

#### a. Capital

##### (2) Capital Stock

24. USTA's simplified TFP model measures capital stock with the perpetual inventory model it used in its original model. Specifically, USTA states that it established a benchmark value of capital based on 1984 plant and equipment using replacement values and USTA's economic depreciation rates.[100] To incorporate the effects of depreciation into the benchmark capital value, USTA adjusts its benchmark capital stock by an economic stock adjustment factor, which is the ratio of economic value to book value, derived by dividing the U.S. BEA replacement cost measures by the BEA quantity of capital stock measures.[101] USTA states that capital stock should be based on replacement costs rather than original costs, because original costs measurements are based on depreciation assumptions that differ from economic depreciation.[102] AT&T bases its capital stock on net book value.[103]

25. USTA states that it replaced its TPIs, based on proprietary data, with asset price indices currently published by BEA. USTA asserts that the use of BEA asset price indices in place of TPIs has virtually no effect on LEC TFP.[104] Ad Hoc and Lincoln also support using BLS or BEA data in place of TPIs.[105] US West and GTE support the perpetual inventory

[98] US West Comments at 11.

[99] USTA Reply, Att. B at 25-27.

[100] USTA Comments at 20-21 and App. A at 15-16.

[101] USTA Comments at 21 and App. A at 16.

[102] USTA Comments at 21.

[103] AT&T Comments, App. A at 70-71.

[104] USTA Comments at 21-22.

[105] Ad Hoc Comments, Att. at 25-26, 42-43; Lincoln Comments at 3-4.

method used in USTA's model, and claim that BLS also employs this method.[106] Ad Hoc does not oppose USTA's perpetual inventory method itself, only the data on which USTA relied in its original TFP study.[107] AT&T also supports the perpetual inventory method.[108]

26. USTA and GTE maintain that the basing depreciation costs on six asset categories is reasonable, observing that BEA also uses broad asset classifications to measure depreciation.[109] These commenters also assert that it would be very time-consuming or impossible to gather the data necessary to calculate depreciation rates for 30 capital accounts.[110]

### (3) Adjustments to Capital Stock

27. Ad Hoc and AT&T criticize Jorgenson's "economic" depreciation analysis on which USTA relied in its original TFP study, as well as its simplified study. Ad Hoc and AT&T state that Jorgenson's analysis was based on a 1981 article by Hulten and Wykoff, which in turn was based on data ending in 1971, and examined depreciation on business assets for the economy as a whole rather than on telecommunications equipment specifically.[111] Ad Hoc notes that the depreciation study on which USTA relied estimated the depreciation rates for broad groups of asset classes which combined telecommunications equipment with other kinds of equipment, based on averages of those asset classes.[112] Ad Hoc also notes that the depreciation rates in this study are lower than either the prescribed depreciation rates or the rates advocated by LECs in depreciation represcription proceedings, and argues that underestimating depreciation artificially reduces TFP growth and the X-Factor.[113] Sprint alleges that USTA's depreciation rates overweight capital input prices.[114] NYNEX responds that USTA's depreciation study is sound, because it avoids creating "asymmetry" between the measurement of LEC capital inputs and

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[106] US West Comments at 14; GTE Comments at 18-19.

[107] Ad Hoc Comments, Att. at 27.

[108] AT&T Comments, App. B at 12.

[109] USTA Comments at 20; GTE Comments at 18.

[110] USTA Comments at 20; GTE Comments at 18.

[111] Ad Hoc Comments, Att. at 20-21; Ad Hoc Reply, Att. at 33; AT&T Comments at 22, App. A at 47-49, App. B at 9; AT&T Reply at 32-34. But see AT&T Reply, App. B at 48-49 ("hyperbolic decay model" used by BLS inferior to "geometric decay model" used by Jorgenson).

[112] Ad Hoc Comments, Att. at 21-22.

[113] Ad Hoc Comments, Att. at 23.

[114] Sprint Comments at 9.

economy-wide capital inputs.[115] USTA and Bell Atlantic assert that USTA adopted only the depreciation method developed in the 1981 article, and substituted the most recent BEA data on equipment lifetimes to develop depreciation rates.[116]

28. Some commenters argue that the depreciation rates should be those prescribed by the Commission.[117] Ad Hoc maintains that the Commission's prescribed depreciation rates are designed to reflect the actual rate of plant retirement.[118] MCI asserts that the Commission's prescribed depreciation rates in fact adequately reflect the economic life of the LECs' plant and equipment.[119] MCI also includes a study of depreciation rates to support its conclusions.[120] In particular, MCI notes that depreciation reserve deficiencies are not excessively high at this time.[121]

29. Several commenters claim that MCI's depreciation study assumes what it purports to prove, that the Commission's prescribed depreciation lives are not unreasonably long.[122] US West asserts that the amount of reserve deficiency is not indicative of whether depreciation lives are reasonable.[123] US West also asserts that MCI proposes updating depreciation rates only every four years, and that this is inconsistent with the current simplified depreciation prescription process.[124] USTA asserts that MCI underestimates the current depreciation reserve deficits.[125] Specifically, according to USTA, several LECs have stopped using FASB 71, and this resulted

[115] NYNEX Reply at 10-11.

[116] USTA Reply, Att. A at 19-20; Bell Atlantic Reply, Att. 1 at 11-12.

[117] MCI Comments at 18-19; Ad Hoc Comments, Att. at 20; AT&T Comments at 22; Ad Hoc Reply at 5.

[118] Ad Hoc Comments, Att. at 22-23.

[119] MCI Comments at 18-19; MCI Reply at 7.

[120] MCI Comments, App. A.

[121] See, e.g., MCI Comments, App. A at 1-4. See also NCTA Reply at 7-8.

[122] USTA Reply, Att. D at 12; Southwestern Bell Reply at 15-16 and App. A at 1-2; US West Reply at 27-28; NYNEX Reply at 11.

[123] US West Reply at 23-24.

[124] US West Reply at 25.

[125] USTA Reply, Att. C at 18-19, Att. D at 13.

in almost $39 billion in additional depreciation reserve deficiencies for the seven BOCs, GTE, Frontier, and SNET.[126]

30. USTA argues that the Commission's prescribed depreciation rates are not "economic" depreciation rates, because they are based on the past history of LEC net salvage rates, retirements, and remaining lives, rather than the economic obsolescence of capital.[127] Southwestern Bell maintains that LECs need to depreciate their plant and equipment now so that they can modernize their networks to provide more sophisticated services.[128] Southwestern Bell also denies that it advocates accelerated depreciation to get current ratepayers to finance future deployment of newer plant.[129] On the other hand, USTA asserts that current customers have always had to finance future technological improvements.[130] Some parties argue that depreciation prescriptions are relevant only in enforcing rate-of-return regulations or calculating sharing obligations.[131] GTE claims that Jorgenson assisted BEA with updating its depreciation lifetimes.[132] Some commenters also argue that it is not fair to require LECs to use longer depreciation lives than IXCs or cable companies are permitted to use for the same or similar plant and equipment.[133] US West alleges that the Commission's depreciation rates are longer

[126] USTA Reply, Att. D at 6-8.

[127] USTA Comments at 18-19; USTA Reply, Att. D at 2-6. See also US West Comments at 13-14; GTE Comments at 17; BellSouth Comments at 13-14; Southwestern Bell Comments at 9 and App. A at 24; USTA Reply, Att. C at 17-18; Bell Atlantic Reply, Att. 1 at 7; NYNEX Reply at 18; US West Reply at 25, 27; GTE Reply at 10. Southwestern Bell also cites a number of revisions to the prescribed depreciation rates that made the rates inconsistent with "economic" depreciation rates Southwestern Bell Comments at 9-10, citing, e.g., Amortization of Depreciation Reserve Imbalances of Local Exchange Carriers, CC Docket No. 87-447, 3 FCC Rcd 984, 986-88 (paras. 17-25) (1988); Amendment of Part 31 (Uniform System of Accounts for Class A and Class B Telephone Companies) so as to permit depreciable property to be placed in groups comprised of units with expected equal life for depreciation under the straight-line method, Docket No. 20188, 83 F.C.C.2d 267 (1980).

[128] Southwestern Bell Reply at 6-7.

[129] Southwestern Bell Reply at 7-8. See also Bell Atlantic Reply, Att. 1 at 12 (asserting that even BEA lifetimes might not be fast enough to reflect economic obsolescence completely).

[130] USTA Reply, Att. D at 13-14.

[131] USTA Reply at 17-18; GTE Reply at 11-12; Pacific Reply at 13-14.

[132] GTE Comments at 17.

[133] NYNEX Comments at 18-19; GTE Reply at 10-11; Southwestern Bell Reply at 4-6; Ameritech Reply at 3-4; USTA Reply, Att. D at 8-11.

than those reported by the LECs to the Securities and Exchange Commission (SEC).[134] Pacific argues that, since the price cap rules prohibit carriers from passing depreciation rate changes to ratepayers, the Commission has no reason to base the X-Factor on prescribed depreciation rates.[135]

31. Some parties note that, under the 1996 Act, the Commission is no longer required to prescribe depreciation rates, and so should not mandate prescribed depreciation rates in TFP measurement.[136] MCI replies that, regardless of whether the Commission continues to prescribe depreciation rates, it will probably continue to retain some oversight over depreciation rates.[137]

### (4) Hedonic Adjustments

32. AT&T and Ad Hoc argue that technological developments since the early 1980s have made it possible for LECs to increase their productivity growth substantially, and that some of this productivity growth might not be captured completely by examining changes in the prices or quantities of capital inputs.[138] Ad Hoc maintains that GDP-PI does not make adjustments for changes in quality.[139] Ad Hoc states that the Commission should either adopt a price deflator other than GDP-PI that would take these technological improvements into account explicitly, or adopt an input price adjustment and retain the consumer productivity dividend.[140] Ad Hoc makes no recommendation at this time as to how to adjust for technological improvements, but asserts that, if this adjustment was a 10 percent annual decrease in the price indices for the input categories which include computers, then this would increase the X-Factor by about 0.4 percent.[141] (Indices reflecting the effects of technology changes are called "hedonic" indices.)

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[134] US West Reply at 24-25.

[135] Pacific Reply at 13-14.

[136] Ameritech Reply at 4; GTE Reply at 11-12, citing 1996 Act. See also USTA Comments at 20.

[137] MCI Reply at 7.

[138] Ad Hoc Comments at 26-27 and Att. at 36-42; AT&T Comments, App. A at 51-58; AT&T Reply at 34; Ad Hoc Reply, Att. at 27.

[139] Ad Hoc Comments, Att. at 29.

[140] Ad Hoc Comments, Att. at 42.

[141] Ad Hoc Comments, Att. at 57-58. In its reply, Ad Hoc claimed that a 10 percent hedonic adjustment would increase the X-Factor by 1.0 when based on data from 1990 to 1994, or 1.1 percent when based on 1989 to 1993, or from 1989 to 1994. Ad Hoc Reply at 4 and Att. at 36-37.

33. Several commenters argue that AT&T and Ad Hoc have not adequately justified the level of their recommended hedonic adjustments.[142] Lincoln also asserts that, by using deflated revenues to measure outputs and inputs, USTA's model captures the majority of hedonic effects.[143] Some commenters also contend that it would be unreasonable to make hedonic adjustments to LEC input data without making such adjustments to the economy-wide input data.[144] Lincoln and BellSouth contend that calculating accurate hedonic adjustments would require complicated and potentially controversial econometric models.[145] BellSouth and Bell Atlantic maintain that AT&T's hedonic adjustment to the capital input results in an offsetting adjustment to its input price differential, and so has no overall effect.[146] On the other hand, CCTA supports making some hedonic adjustment.[147]

### (5) The Flow of Capital Services

34. USTA and US West assert that it is standard practice to impute capital services from capital stock rather than capital consumption, and that it would be unreasonable to equate capital services provided with loss of capital efficiency, as they claim the Commission did.[148] USTA analogizes telecommunications to a light bulb. According to USTA, a light bulb provides light at the same level of efficiency regardless of its age, until the bulb burns out.[149] AT&T also claims that imputing the flow of capital services to be proportional to the aggregate stock is consistent with economic theory. AT&T claims further that capital consumption is a cost of capital rather than a measure of capital input, and so should not be used as a measure of capital input.[150]

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[142] USTA Reply, Att. A at 17-18; Southwestern Bell Reply at 14; GTE Reply at 12-13; Sprint Reply at 9; NYNEX Reply at 16; BellSouth Reply, Att. at 12.

[143] Lincoln Reply at 12 and Att. B.

[144] USTA Reply at 12 and Att. A at 18; BellSouth Reply, Att. at 6-9; Southwestern Bell Reply at 15; NYNEX Reply at 16; Lincoln Reply at 12-13.

[145] Lincoln Reply at 12-13; BellSouth Reply, Att. at 12-13.

[146] BellSouth Reply, Att. at 10-11; Bell Atlantic Reply, Att. 1 at 9-10. See also Sprint Reply at 9 (in a direct approach using only LEC-specific data, any hedonic adjustment would affect input prices and TFP equally, and so would be superfluous).

[147] CCTA Reply at 15-16, 17-18.

[148] USTA Comments at 22-23 and App. A at 21; US West Comments at 14.

[149] USTA Comments, Att. A at 21.

[150] AT&T Comments, App. B at 13.

### (6) Implicit Rental Price

35. USTA asserts that its implicit rental price is based on a well-accepted theory of capital and can be updated on a timely basis.[151] US West and GTE support USTA's method of developing implicit rental prices.[152] GTE also contends, however, that the implicit rental price introduces volatility to input prices.[153] USTA and US West suggest using a three-year moving average for the implicit rental price.[154]

36. For purposes of calculating the implicit rental price in its simplified TFP method, USTA bases the cost of capital on the implicit cost of capital embedded in National Income and Product Account data, claiming that this is the closest approximation of the opportunity cost of capital that can be based on publicly available data.[155] USTA also asserts that its revised cost of capital includes both debt and equity costs, and so is an improvement over the cost of capital in its original TFP Model.[156] US West argues that the National Income and Product Accounts treat LEC cost of capital and the economy-wide cost of capital symmetrically.[157] Ad Hoc argues that an economy-wide measure of the cost of capital is not appropriate for LECs because the general economy is more competitive than the LEC industry is currently.[158] GTE agrees that the cost of capital should include both debt and equity costs, but would support basing the cost of capital on either Moody's Utility Bond yields or National Account data.[159] In its comments, Ad Hoc suggests adjusting Moody's Bond yields to reflect the fact that taxes apply only to returns on equity, not interest paid on debt, although it supports AT&T's cost of capital measure in its reply.[160]

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[151] USTA Comments at 23.

[152] US West Comments at 14-15; GTE Comments at 19-20.

[153] GTE Comments at 20.

[154] USTA Comments at 23; US West Comments at 14-15.

[155] USTA Comments at 16-17.

[156] USTA Reply at 8. See also USTA Comments at 17. A number of parties criticize USTA's original TFP study because it used Moody's Public Utility Bond yields to determine the cost of capital, which incorrectly excludes the cost of equity. Ad Hoc, App. at 18; AT&T Comments at 18-19 and App. A at 45-47; USTA Comments at 17; Southwestern Bell Comments at 7 n.12.

[157] US West Comments at 12-13.

[158] Ad Hoc Reply at 4-5 and Att. at 29-32.

[159] GTE Comments at 16.

[160] Ad Hoc Comments, Att. at 19.